CALIFORNIA DEPARTMENT OF TRANSPORTATION

Journal

October–December 2000 Volume 1 · Issue 2

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A Letter to Readers

I am extremely grateful to the dedicated men and women of our agency for their professional contribution to the safety of California's motorists. The departments within the Business, Transportation and Housing Agency comprise the Governor's principal transportation regulatory and enforcement organizations. By combining their resources, we are making driving safer, as evidenced by the fact that the number of fatalities per miles traveled is now the lowest in the state's history.

As Secretary for Transportation, I am committed to having the best traffic safety programs possible, including anti-DUI, bicycle and pedestrian safety, occupant protection, police traffic services, roadway safety and emergency medical services. These programs and so many others are helping California achieve its traffic safety successes, such as having the highest seat belt compliance rate in the nation.

Maria Contreras-Sweet

I have a charge from Governor Gray Davis to improve safety on California's roadways. That means relieving traffic congestion, thus affording people more quality time for work and family life. We all enjoy getting home quickly and safely after a hard day's work.

One of our shared goals is to alleviate traffic congestion by stopping unsafe driving behaviors that contribute to accidents. Through funding for more law enforcement personnel and equipment, emergency response vehicles and public education, we will make our roads even safer. We are also excited about the new partnerships being established with community-based organizations in California. This innovation will expand our outreach enormously. The Governor recently awarded $11.8 million to local community-based organizations to promote traffic safety programs.

Traffic safety is everyone's business. Governor Davis and I look forward to working with all of you to improve the quality of life for all Californians.

Maria Contreras-Sweet

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by Larry Orcutt • Headquarters Maintenance Chief
Photos by Don Tateishi

DESIGNING FOR Maintenance Safety

In the more than 100 years of proud history of the California Department of Transportation, 155 workers on California highways have been killed while trying to perform their duties. Twenty-nine maintenance workers have lost their lives on highway roadsides since 1972 as a result of being struck by errant vehicles. Many more have been injured. These tragic statistics have led Caltrans to a serious examination of designing for maintenance-friendly highways and roadside environments.

In essence, any design feature that requires a worker to be near traffic, whether in a vehicle or on foot, is one that increases the danger for workers. Designs should allow workers to work well away from traffic and even better, behind a physical barrier. Reducing or consolidating the number of maintained roadside features or allowing for mechanical maintenance operations also are important long-term safety concepts.

And, concurrently, most of the features that protect workers also provide benefits to California citizens in the form of lowered maintenance costs, lowered traffic congestion, reduced herbicide use, reduced groundwater degradation, less erosion and longer facility life-cycles.

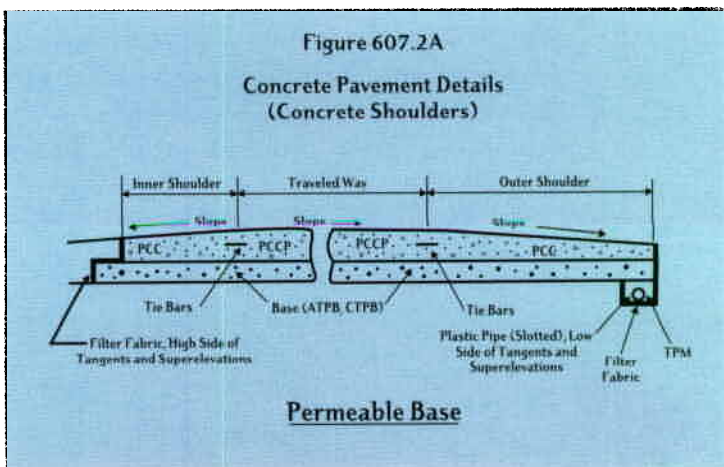
What does this require of design personnel? It means the job of developing maintenance-friendly highway design starts with scoping. Funding for maintenance safety improvements and other features that reduce maintenance life-cycle costs should be included in the cost of the project.

Knowledgeable maintenance staff should be a part of all project development teams, and project plans must be reviewed carefully by maintenance personnel. When developing a Project Initiation Document for the rehabilitation or improvement of an existing facility, the Project Engineer should perform a field review with Maintenance staff to identify features that could put workers in danger or increase maintenance effort.

Maintenance-friendly highway design starts with the pavement. The most dangerous place for a maintenance worker is in a traveled highway lane, even though all possible safety measures are being taken. And the worst enemy to pavement longevity is water. Where appropriate, and especially on busy freeways, new 40-year pavement design standards help meet cost, congestion reduction, safety and longevity objectives.

Only slightly less dangerous than the pavement itself are the median and road edge of a busy freeway. In general, designs should accommodate mechanical, rather than hand maintenance operations. Median plantings should be avoided wherever possible; when local pressure for beautification forces the department to use median plantings, indigenous plants, or those adapted to the local environment and requiring little or no care at all, should be used. (Caltrans' old friend, the oleander, has been a great median planting for years, but now is under siege by California's newest pest, the glassy-winged sharpshooter.)

Where possible, continuous median concrete barrier should be used to minimize the number of visits maintenance workers must make to a highway median. Pavement should extend to the median barrier to eliminate weed control and allow for mechanized sweeping. Remember, sending a crew to work in the median of an operating freeway increases



worker exposure and requires closure of both fast lanes. As capacity is strained on the busiest freeways, even in off-peak hours, this often means traffic congestion.

Recent revisions to the traffic manual provide guidance for the placement of concrete rail at the shoulder. Concrete rail at the outside pavement edge, in lieu of metal, minimizes the number of visits maintenance workers will have to make for repairs. Remember that rail is generally placed in areas that take the most traffic hits. Building in maintenance tasks into these areas increases the risk of worker injury. Pavement should extend to the barrier to reduce weed control and allow for mechanical sweeping.

A fully paved outside shoulder reduces exposure of soils to erosion and allows room for maintenance vehicles to make necessary stops. Designers should also consult with maintenance staff to provide frequent pullouts where vehicles can be parked off the roadway – shielded from oncoming traffic – during operations. Pullouts may be used not only by maintenance staff, but by surveys or designers and others making on-road field inspections.

Designers should group facilities that have to be manipulated by hand, such as traffic and irrigation controllers, well away from the traveled way, and wherever possible, allow access to them from side streets, rather from within the highway right-of-way. They should be placed on the inside, rather than the outside, of curves, since errant vehicles tend to stray toward the outsides of curves. Access to these facilities at freeway interchanges should be provided from nearby streets, rather than from the freeway.

Access to steep cut slopes should be provided from the top of the slope, to allow for mechanical litter and weed control and to reduce exposure of workers, vehicles and equipment to errant vehicles.

Where possible, designers should provide side slopes that are 1:3 or flatter. This allows the operation of mechanical mowers and other equipment. Flatter slopes not only reduce storm water erosion, they provide a more driveable surface to allow the driver of an errant vehicle to recover control.

Pullouts reduce exposure of workers and vehicles to freeway traffic

Low-maintenance indigenous plants mean fewer trips to roadsides by maintenance workers.

Signs and light standards and other appurtenances should be placed well away from the traveled way and, where possible, incorporated into sound walls and bridges, rather than adjacent to them. Water should be channeled away from the roadway toward down drains, which can become clogged, causing sheeting on the highway surface and putting maintenance workers in danger when they have to be cleaned. National Pollution Discharge Elimination requirements mean filtration of drains and will increase the exposure of workers if the drains are not properly placed.

Designers should consider graffiti prevention and removal by using appropriate plantings. Signs and other appurtenances should be as inaccessible as possible to taggers; use shrouds on signs that make them inaccessible to graffiti artists. Access to sound walls for removal of graffiti and debris should be provided from side streets rather than from the traveled roadway.

These tips and others on maintenance-friendly design generally can be found in the Caltrans Highway Design Manual. But there is no substitute for getting to know your counterparts in maintenance. Assuring that maintenance and safety are considered carefully during scoping and design is the responsibility both of Design and Maintenance.

Next project you get, call up one of the gang with the orange trucks and go out and look together at the project. After all, if it can be maintained efficiently, your design will look good, function properly, save taxpayers' money and may just save a life.

Maria Contreras-Sweet
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Gray Davis
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Jeff Morales
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